PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6:		(11) International Publication Number: WO 98/371
C08K 3/20, 3/36, 5/05, C08L 63/00, 63/02, 63/04	A1	(43) International Publication Date: 27 August 1998 (27.08.9
(21) International Application Number: PCT/US (22) International Filing Date: 19 February 1998 (BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, M
(30) Priority Data: 60/038,108 19 February 1997 (19.02.97) 60/069,179 11 December 1997 (11.12.9) 09/025,532 18 February 1998 (18.02.98) (71) Applicant: GEORGIA TECH RESEARCH CORPOLIUS/US]; Centennial Research Building, 400 Tentential, GA 30332-0415 (US).	7) () (RATIO th Street	ct,
(72) Inventors: WONG, Ching-Ping; 3422 Glen Devo Berkeley Lake, GA 30136 (US). SHI, Song-Hi Westshire Place, Atlanta, GA 30318 (US).	on Lan ua; 10t	.c. 37
(74) Agent: HORSTEMEYER, Scott, A.; Thomas, Kayden meyer & Risley, L.L.P., Suite 1500, 100 Galleria l Atlanta, GA 30339 (US).	. Horst Parkwa	у.
(54) Title: LOW-COST HIGH-PERFORMANCE NO-FLOW UNDERFILLS FOR FLIP-CHIP APPLICATIONS		

(57) Abstract

A no-flow underfill encapsulant for flip-chip technology using a viscosity-controlling agent such as furned silica and a coupling agent in a formulation comprising an epoxy resin(s), an anhydride hardener, an accelerator, a surfactant and a fluxing agent provides optimized flow and a curing reaction only after attaining the maximum solder bump reflow temperature of from about 190-230 degrees centigrade.

BEST AVAILABLE COPY